

**TURTLE MOUNTAIN COMMUNITY COLLEGE
PROJECT REPORT****PROJECT NAME:** *Graphing Calculator Mini Course (NAGW-4953).***PI:** Sunil R. Karnawat **PERFORMANCE PERIOD:** 1/96 to 12/96 **AMNT:** (NASA FY 96) \$ 30,000**PROJECT OVERVIEW:**

The "Graphing Calculator Mini Course" project provided a mathematically-intensive technologically-based summer enrichment workshop for teachers of American Indian students on the Turtle Mountain Indian Reservation. Eleven such teachers participated in the six-day workshop in summer '96 and three Sunday workshops in the academic year. The project aimed to improve science and mathematics education on the reservation by showing teachers effective ways to use high-end graphing calculators as teaching and learning tools in science and mathematics courses at all levels. In particular, the workshop concentrated on applying TI-82's user-friendly features to understand the various mathematical and scientific concepts.

TARGET AUDIENCE:

Participants Targeted: Teachers of American Indian high school and college students.

Courses Targeted: High school and college algebra, trigonometry, precalculus, calculus, matrix algebra, statistics.

Selection Criteria: Must teach math and/or science courses in surrounding high schools and college; support letter from administration; and a letter from each participant describing teaching experience, math reform climate at school, view towards technology, and commitment to use graphing calculators in classrooms.

Recruitment Strategies: Advertisement through high school and college news letters, letter to high school and college administrations, brochures and hand-outs, radio announcements, presentations on activities of the project, and the personal contact with math and science teachers.

ENROLLMENT DATA:

Total enrollment since project inception: 3 TMCC teachers and 7 high school teachers

Current teacher enrollment: 11

Male teachers: 9

Female teachers: 2

MAJOR STRATEGIES:

Partners: North Dakota State University, University of Michigan, Turtle Mountain Community High School, St. John High School, and Rolla High School.

Strategies: Six-day workshop offered in summer '96 which is supplemented with three strong follow-up sessions. Project director also visited the classrooms of each participated teacher in the academic year to evaluate the effect of summer workshop. The teachers received TI-82 calculator and each participating school received TI-82 projection screen with projection calculator. Besides, for teachers to continue to use this technology after returning to their classrooms, NSF funded Rural Systemic Initiative program based at Turtle Mountain Community College provided each school with ten TI-82 calculators.

OUTCOMES TO DATE:

Results: An evaluation is done by the project staff. Each participant is tracked to measure the impact of the project on his or her teaching math and/or science courses. Project director is frequently interacting with teachers and visiting their classrooms. Teachers are increasingly using the graphing calculators in their classes.

Tracking: Each participant is tracked by name, gender, participating school, and courses responsible for teaching.

Lesson's Learned: As outlined in proposal, fifteen teachers applied to program but only eleven decided to participate; thus, in future, efforts should concentrate on improving this situation.

Issues/Challenges: Continuation of the funding, sustaining the climate created by this workshop over the longer period of time, and involving more number of teachers and teachers-aides from the elementary to high school in projects like this in order to achieve a long-term goal of increasing number of American Indians students in the math, science, and engineering based disciplines.



Turtle Mountain Community College

P.O. Box 340
Belcourt, North Dakota 58316

Telephone: (701) 477-5605
Fax: (701) 477-5028

Turtle Mountain Band
of
Chippewa Indians

Charter Member
American Indian
Higher Education
Consortium

EVALUATION

“Graphing Calculator Mini Course
for Teachers of American Indian Students on the
Turtle Mountain Indian Reservation”

December 1996

William L. Gourneau, BS, BA, MS
Acting Academic Dean
Turtle Mountain Community College
Belcourt, North Dakota

INTRODUCTION

This specific evaluation will examine the objectives and goals of the program “Graphing Calculator Mini Course for Teachers of American Indian Students on the Turtle Mountain Indian Reservation.” Through observation, interviews and a survey of participants, data will be collected to determine the program’s validity of meeting the objections and goals as stated.

RATIONALE

It is agreed that there is a need to provide Native American students with opportunities for improvement in the Math and Science areas. The challenge is to explore new and innovative means to provide exciting teaching concepts to Math and Science teachers of Native American students. There are existing initiatives geared toward developing and implementing teaching methods that take on this challenge and through funding from organizations the opportunities are provided. One such opportunity is the “Graphing Calculator Mini Course for Teachers of American Indian Students on the Turtle Mountain Indian Reservation.” This program is funded by NASA through the Turtle Mountain Community College.

The Turtle Mountain area is a highly populated community with a American Indian student population that would benefit most from the activities proposed. While the Turtle Mountain area school systems have adequate math and science curriculum, the proposed program would be a positive contribution to the existing

math and science departments.

EVALUATION

Prior use of TI-82 Graphing calculators has been limited to only one math and science teacher (indicated in the survey of the participants in the Mini Course). As program participants became more familiar with the TI-82, it is documented through the interviews and survey that the use of the calculator is quickly becoming a device of teaching in math and science courses at the college and high school levels. The courses include: *College* - Microbiology, Chemistry, Intermediate Algebra General Ecology, General Zoology and Fish and Wildlife Management; *High School* - Algebra, Physical Science, Chemistry, Earth Science, Biology, Physics, and Senior Advanced Math. There are currently 67 High School American Indian students enrolled in the above mentioned courses that are gaining valuable experience with the TI-82 graphing calculator. There were no students at the college level at this point, but a CBL is set up in Chemistry and the instructors are developing plans to utilize the calculator during the Spring 1997 semester. A bonus to the participants of the program included distribution of 10 TI-82 Graphing Calculators to each school for math and science courses currently being offered. This distribution served as an incentive to encourage area schools to purchase additional calculators for the 1997-98 academic year, but also to supply the participants with much needed calculators for this academic year.

It is overwhelming felt by the program participants that the week long campus training was very good. The instructors, Dr. Robert Megginson and Dr. Martha Aliaga were recommended by the American Indian Science and Engineering Society (AISES) to the program coordinator Sunil Karnawat for the week long session. The program participants indicated that the materials and information provided by Dr. Megginson and Dr. Aliaga was excellent and a valuable experience.

Though the participants expressed positive feedback towards the instructors and the program it was felt that there is a need to expand the time of the program. One week during the summer was not enough time and it was suggested by most of the participants that this time be extended by a week or two. The follow up meetings of the program participants and the program coordinator have been well attended and the participants are pleased with the results. The classroom on the Turtle Mountain Community College is adequate and has access to the equipment needed to supplement the course work. The Program Coordinator has provided continuous consultation to participants and has visited every classroom during the Fall semester. When asked, the participants indicated that they would again participate in the program and would encourage their colleagues to also attend, in fact all participants stated that they are sharing the information learned through the Mini course with others.

SUMMARY

The information received from program participants have indicated a group of Math and Science teachers that are very much pleased with the training that was provided to them. With the exception of a need for extended time for training and more contact from the program coordinator, the results show a successful program that is making it's mark in local schools. The need for additional calculators is being addressed through the purchasing of calculators from other math and science sources, and the schools as time progresses. The number of American Indian students (67) enrolled in Math and Science indicates that there is interest by students in challenging course work. As the word of the program gets through the community interest in the program by other teachers would also increase the number of participants. As indicated the program has satisfied all requirements that have been stated initially in the grant application.